REMARKS

This communication is responsive to Office Action of November 30, 2004 in which the following objections were raised: [5] Claims 1-5, 7-13, 15-17 and 19-20 were rejected were rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. U.S. Patent 6,754,261 B1 in view of Uesugi et al. U.S. Patent 5, 563, 911; [6] Claims 6,14 were objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant appreciates the Examiners indications of allowable subject matter in Claims 6,14. Applicant appreciates the Examiner's teleconference with this correspondent on February 1, 2006 in which the Examiner's withdrawal of the allowance of Claim 8 was discussed.

Applicant has canceled Claims 1, 2, 4, 5, 9, 11-13, 15-20 and amended remaining Claims 3, 6, 7, 8, 10, 14.

5 CLAIMS 1-5, 7-13, 15-17 and 19-20 REJECTED UNDER 35 USC 103(a):

Claims 1-5, 7-13, 15-17 and 19-20 were rejected were rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. U.S. Patent 6,754,261 B1 in view of Uesugi et al. U.S. Patent 5, 563, 911.

Applicant has Canceled Claims 1, 2, 4, 5, 9, 11-13, 15-20 and extensively amended remaining rejected Claims 3, 7, 8, and 10. Independent Claim 10 from which Claims 3 and 7 depend includes the following limitations:

> *"...a ...TEQ...configurable as to at least one of a number of time domain equalization taps on the receive path and delays between the taps on the receive path;*
>
> *a ...DFT... configurable as to a number of tones per symbol of the received*

communication channel transformed from a time domain to a frequency domain; and

at least one scaler coupled to the TEQ and the DFT component and the at least one scaler responsive to a determination that the received communication channel exhibits a cutoff frequency less a maximum frequency proscribed by the X-DSL communication protocol to reduce both a sampling rate of a received communication channel together with a number of tones per symbol transformed by the DFT component and to increase at least one of a number of time domain equalization taps on the receive path and delays between the taps on the receive path, thereby scaling the receive path to conform with a length of the at least one subscriber line."(Applicant's amended Claim 8, emphasis added)

Independent Claim 8 includes the following limitations:

"...determining whether the received communication channel initiated in the initiating act exhibits a cutoff frequency less than a maximum frequency proscribed by the corresponding X-DSL communication protocol, above which cutoff frequency communications are not supportable;

reducing a sampling rate of the received communication channel below a sampling rate required to support the corresponding X-DSL communication protocol responsive to the determination of the cutoff frequency in the determining act; and

increasing at least one of a number of time domain equalization taps operating on a receive path of the multi-tone X-DSL modem and delays between the taps operating on the receive path responsive to the reduction of the sampling rate in the reducing act, whereby a number of time domain equalization taps increase in correspondence with a length of the subscriber line thereby offsetting an increase in intersymbol interference associated therewith; and

reducing a number of tones per symbol transformed from a time domain to a frequency domain responsive to a reduction in the sampling rate of the received communication channel in the reducing act."(Applicant's amended Claim 8, emphasis added).

The Applicant respectfully rejects the Examiner's characterization of the Liu reference as teaching a means for determining the highest useful frequency component in the received communication channel. The Liu reference determines the best Nyquist rate to provide to the TEQ, where the rate that is chosen corresponds with a degree of oversampling above the required Nyquist rate by a multiple N*fs for the associated X-DSL protocol. "*...provides ...samples to the TEQ...at the Nyquist rate, fs, which is determined by the type of ADSL channel (2.208 MHz for G.dmt...1.1.4 MHz for G.lite..... The A/D ...over-samples the received signal at a predetermined multiple N times the Nyquist rate....* "(Liu at col. 24, lines 38-43, 47-49). These teachings are not directed to determining a highest useful frequency component in the actual channel or to determining the existence of a cutoff frequency falling well below the maximum frequency specified by the corresponding X-DSL protocol. This reference does not teach configuration of a TEQ tap or delay responsive to a cutoff frequency determination, nor does it teach or disclose a DFT in which the number of tones in a tone set is reduced below the amount specified by a corresponding X-DSL protocol in response to a determination of a cutoff frequency on the actual communication channel.

Nor are these various limitations found in the Applicants amended Claims supplied by the Uesugi reference. The Examiner has characterized the Uesugi reference as teaching a TEQ with a configurable number of TAPS. The Uesugi reference has configurability, albeit not as to the number of TAPS, rather as to whether those TAPS effect an FIR or an IIR filter. Uesugi table 1 found on column 6 lines 41-52 has a constant number of TAPS, i.e. 6, which effect FIR and IIR functions on the receive path. The Uesugi reference is not directed to multi-tone X-DSL communications, it has no teaching as to variations in sample rate, nor to determination of a cutoff frequency in a received communication channel which would warrant a reduction in the sampling rate. It does not disclose a DFT let alone one which is configurable in response to a determination of a cutoff frequency in the received communication channel and a corresponding reduction of the sampling rate.

Applicant respectfully submits therefore that neither the Liu nor Uesugi references singly or in combination teach or suggest either the determination of a cutoff frequency in a received multi-tone modulated communication channel or the reduction in sampling rate, and size of tone set and increase in TEQ taps responsive to the determination. All these limitations found in the Applicant's amended Claims are fully supported in the specification. *"...[T]he maximum frequency of the received communications is determined.... the scaler 140 sets the sampling rate for the ADC and/or the decimation rate for the decimator .... the scaler sets the number of tone bins per symbol for the DFT accordingly. "* (Applicant's Specification at page 12, lines 15-22) *"The TEQ is inversely scalable with the received bandwidth. Thus as the usable received bandwidth decreases for longer line lengths the number of taps in the TEQ can be increased to handle the longer delay times... "* (Applicant's Specification at page 8, lines 23-25) See also FIGS. 1, 2A, 2B and associated description.

The Applicant therefore respectfully requests that the Examiner withdraw the rejection of remaining rejected Claims 3, 7,8, and 10, for the reasons discussed above, and in the case of dependent Claims 3 and 7 for other reasons of independent significance.

6 CLAIMS 6, 14 OBJECTED TO:

Claims 6, 14 were objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant gratefully accepts the Examiner's acknowledgement of allowable subject matter in Claims 6, 14. Applicant has amended both claims into independent form incorporating all the limitations of the base and intervening claims from which they formerly depended. These Claims are thus believed to have been amended into a condition for allowance.

CONCLUSION

In view of the above remarks, and the amendments to the Claims, Applicant respectfully submits that all remaining Claims 3, 6, 7, 8, 10, 14 have been placed in a condition for allowance, and requests that they be allowed. Early notice to this effect is solicited.

The Commissioner is authorized to charge any additional fees which may be required, including petition fees and extension of time fees, to Deposit Account No. 50-1338 (Docket No. VELCP015).

Favorable consideration is respectfully solicited.

Respectfully submitted,
IP Creators

Date: February 1, 2006

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